Work Order ID July-11-12 9:44:29 AM				*871	57*				,		Page 1	
Revision ID:	664-203TRN be Turning Detail			Accept	*N900	040	100)* s	etup Star Stop	1/1	S1* S2*	
Start Date: 7/11/12 Required Date: 8/10/12 Reference:	2 Start Qty		*1* *1*		Cust Item I Customer:	D:					5 /	
	ss Plan:	ρĺ	Date://	Z-Tooling: SPC (Y/N):		ate:		R	tun Star Stop	I <i>Л</i>	R1* R2*	
Sequence ID/ Work Center ID	Operation Description			Set Up/ Run Hours	Tool ID	Tool#	Plan Code	Accept Oty	Reject Qty	Reject Number	Insp. Stamp	
Draw Nbr	Revision Nbr								· · · · ·			
D412-664-243	Rev E(DEO)		į.									
100 *100* Mori Seiki	MORI SEIK	I CNC LATI	HE LARGE	0.00					Ø.			
Mori Seiki CNC Lathe Large		1-Fill tube w 2-Turn first	side as per Folio FA166 ition lines smooth.	OT8534 on both ends as po	er Folio FA166		·			,	gngn, 12/07,	l /20
110	QC1- Inspec	t dimensions	s to dimension sheet	0.00								
110 QC Quality Control		Memo		0.00					J		angn.l	, · ·

12/07/20

W/O:										
DATE	STEP		PRO	OCEDURE CHANGE		Ву	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
	ļ		. <u></u>							
Part No			PAR #:	Fault Category:	NCF	R: Yes	No DQ	A :	Date: _	
	F	Resolution:		Disposition:	QA:	N/C C	Closed:		Date:	

		WORK ORD	ER NON-CONFORMANO	CE (NCR)			
	Description of NC		Corrective Action Section B		Varification	Approval	Approval
STEP	Section A	Initial Chief Eng	Action Description Chief Eng	Sign & Date	Section C	Chief Eng	QC Inspector
					-	:	
	· · · · · · · · · · · · · · · · · · ·						
	STEP	STED Description of NC	STEP Description of NC Section A Initial	STEP Description of NC Corrective Action Section B Initial Action Description	STEP Description of NC Corrective Action Section B Initial Action Description Sign &	STEP Description of NC Initial Action Description Sign & Section C	STEP Description of NC Section A Possible Section A Possible Section A Possible Section C Sectio

Work Ord <i>July-11-12 9:4</i>		7157		*871	157*						Page 2	
Item ID: Revision ID:	D412-664-2	203TRN		Accept	*N900	040	100)* s	etup Stai	I VI	S1*	
Item Name:	Crosstube Tu	urning Detail							Sto	° *N	S2*	
Start Date: Required Date	7/11/12 : 8/10/12	Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item I Customer:	ID:						
Reference:		•	•						·			
Approvals:	Process P	lan:	Date:	Tooling:	Da	ate:		R	tun Star	1/1	R1*	
	QC:		Date:	SPC (Y/N):	Da	ate:			Sto	* *N	R2*	
Sequence ID/ Work Center I	D	Operation Description		Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp	
120		•		0.00				- •				
120		MORI SEIKI CNC LATI	HE LARGE					/	D	KC	12-	7-7
Mori Seiki		Memo		0.00								
Mori Seiki CNC La	athe Large	2- File trans 3- Remove							/			
130		QC1- Inspect dimensions	s to dimension sheet	0.00					/			
130								/	ϕ	L	c 12-7	7-71
QC		Memo		0.00					/		,	- •
Quality Control		+ PERFORM	M ULTRA SONIC MEA	ASUREMENT			_	I				
			•				DAG!					

12-7-21

*14**0***

140

Memo

0.00

0.00

Quality Control

+ CHECK ULTRA SONIC MEASUREMENT AND ORIENTATION FOR

BENDING

QC8- Inspect parts - second check

W/O:	-	WORK ORDER	CHANGES					
DATE	STEP	PROCEDURE CHANGE		Ву	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC inspector
								ەمر
			The state of the s	**************************************				

Part No:	· /	PAR #:	Fault Category:	NCR: Yes No DQA:	ୃDate:
. · . · • • • • • • • • • • • • • • • • • •	Resolution:		Disposition:	QA: N/C Closed:	Date:

NCR:				Corrective Action Section B				<u> </u>
DATE	STEP	Description of NC Section A	Initial Chief Eng	Action Description Chief Eng	Sign & Date	Verification Section C	Approval Chief Eng	Approval QC Inspector
<u> </u>								
	,							

Work Order ID 87	715′	7
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87157

Page 3

July-11-12 9:4	4:29 AM			()/	.) /							
Item ID: Revision ID:	D412-664-	203TRN		Accept	*N900	040	100)* s	etup	Start	*N	S1*
Item Name:	Crosstube T	urning Detail								Stop	*N:	S2*
Start Date:	7/11/12	Start Qty: 1.00	*1*		Cust Item 1	D:						
Required Date	: 8/10/12	Req'd Qty: 1.00	*1*		Customer:							
Reference:								T.	 .	Start	•	
Approvals:	Process P	Plan:	Date:	Tooling:	D	ate:		r	Run		*N	R1*
	QC:		Date:	_ SPC (Y/N):	D	ate:				Stop	*N	R2*
Sequence ID/ Work Center I	D	Operation Description		Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Rej Qty		Reject Number	Insp. Stamp
145				0.00				11))	1		~ .
145 Crosstubes		Memo		0.00				12p	1	12	- + -	24
Crosstubes			LY TRANSITION LINES	S SMOOTH LONGITUDE	WAY.							
150				0.00								
150				0.00				1700		17	- 7 -	74
HandFXtube		Memo		0.00				-1201	100-	12		24
Hand Finishing Cro	osstubes	1- PRESSU	RE WASH X-TUBE INS	IDE AND OUT				//	YKO)		
		2- ACID ET	CH X-TUBE INSIDE A	ND OUT. USE RED SCOT	TCH BRITE						:	
160		QC5- Inspect part comp	leteness to step on W/O	0.00								•
160 QC Quality Control		Мето		0.00		045 03	N A	>)		7-8	24
							7					,

W/O:			WORK ORDER CI						1
DATE	STEP	PROC	EDURE CHAI	NGE	Ву	Date	Qty	Approvai Chief Eng / Prod Mgr	Approval QC Inspector
Part No	:	PAR #:	_ Fault Cate	gory:	NCR: Yes	No DQ	A:	Date:	
	Re	esolution:	_ Disposition	n: <u>`</u>	QA: N/C CI	osed:		Date: _	
NCR:		W	ORK ORD	R NON-CONFORMA	NCE (NCR)			
	0750	Description of NC		Corrective Action Section		Verific	eation	Approval	Approval
DATE	STEP	Section A	Initial Chief Eng	Action Description Chief Eng	Sign & Date	Secti		Chief Eng	QC Inspector
					i				
		5.							
-									
									· ·

Work Order ID 87157 *87157* Page 4 July-11-12 9:44:29 AM Item ID: D412-664-203TRN Accept *N900040100* Setup Start **Revision ID:** Crosstube Turning Detail **Item Name:** *1* 7/11/12 Start Oty: 1.00 **Start Date: Cust Item ID:** Req'd Qty: 1.00 Required Date: 8/10/12 **Customer:** Reference: Run Start Process Plan: Approvals: Date: Tooling: Date: Stop QC: Date: SPC (Y/N): Date: Sequence ID/ **Operation** Set Up/ Tool ID Tool # Plan Reject Accept Reject Insp. Work Center ID Description **Run Hours** Code **Qty** Otv Number Stamp 170 0.00 MO 12-7-24 Packaging *170* Packaging 0.00 Memo Identify and stock in kanban rack Packaging Location: LL MLJ 12/07/25 180 QC21- Final Inspection - Work Order Release 0.00 *120*

0.00

Memo

Quality Control

W/O:									
DATE	STEP	PRO	CEDURE CHAI	NGE	Ву	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
				·····-					
								:	
Part No		PAR #:	Fault Cate	gory:N	CR: Yes	No DQ	A:	_ Date: _	
	R	esolution:	Disposition	n: <u>`</u> G	A: N/C C	losed:		Date: _	
NCR:			WORK ORDI	ER NON-CONFORMANO	CE (NCF	R)			
DATE	STEP	Description of NC		Corrective Action Section B		Verific		Approval	Approval
	0.2.	Section A	Initial Chief Eng	Action Description Chief Eng	Sign 8		on C	Chief Eng	QC inspector
į									
					<u> </u>				
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i									
			1					ŀ	

July-11-12 9:44:29 AM

Work Order ID:

87157

Parent Item:

D412-664-203TRN

Parent Item Name:

Crosstube Turning Detail

Start Date: 7/11/12

Required Date: 8/10/12

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:A 08-03-06 new issue DD verified by:eec

IPP Rev B 08.04.02 Removed polish EC verified by: DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6009-129		Manufactured	No			120	Each	19.0000	1	1			
Crosstube Material									<u> </u>				

Location

LG

Loc Qty

Loc Code

19 19

- man. 12/07/19

Dail Aci	ospace	LIU		· ·						
W/O:			WO	RK ORDER CHANG	ES					
DATE	STEP	PRO	CEDURE CHAN		B	У	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
_										
			4							
				% ·						
										·
			-							
Part No	•	PAR #:			_ NCR: \	es N	o DQ	Date:		
	Re	esolution:	Disposition	: <u>`</u>	_ QA: N/	C Clos	sed:		Date: _	,
NCR:			WORK ORDE	R NON-CONFORM	ANCE (N	ICR)				
DATE	STEP	Description of NC			tion B		Verific	cation	Approval	Approval
DATE	SIEP	Section A	Initial Chief Eng	Action Description Chief Eng		gn & Date		ion C		QC inspector
- , , ,,										
										;

DART AEROSPACE LTD	Work Order:	87157
Description: Crosstube Assembly (412 High Aft)	Part Number:	D412-664-243
Inspection Dwg: D412-664-243 Rev: E		Page 1 of 2

FIRST ARTICLE INSPECTION CHECKLIST

	spection Sheet wing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments		
	2.684	+0.005/-0.000	2.688			VEEN	CNC-03		
	2.748	+0.005/-0.000	2.752						
	2.884	+0.005/-0.000	2.889	()					
	3.019	+0.005/-0.000	3.024	//			4		
	3.163	+0.005/-0.000	2.168						
	3.308	+0.005/-0.000	3,373						
Ä.	3.429	+0.005/-0.000	3.432						
SIDE	2.990	+0.005/-0.000	2.993	1					
တ	2.618	+0.005/-0.000	2.623						
						7			
	0.200	+/-0.010	-200			Y	V		
	R0.063	+/-0.010	.063		,	Lb	<u> </u>		
	R0.500	+/-0.010	-500			RL			
	4.971	+/-0.030	4,971			VERN	CNC-08		
ļ	2.684	+0.005/-0.000	2.688						
·	2.748	+0.005/-0.000	2.752.						
-	2.884	+0.005/-0.000	2.889						
	3.019	+0.005/-0.000	3,024						
	3.163	+0.005/-0.000	3 168	/					
	3.308	+0.005/-0.000	3.713						
8	3.429	+0.005/-0.000	3.433						
SIDE	2.990	+0.005/-0.000	2.993	1					
ङ	2.618	+0.005/-0.000	2.621	/					
							7		
	0.200	+/-0.010	200			4	**		
	R0.063	+/-0.010	.063	//		R6			
	R0.500	+/-0.010	1500	/		16			
	4.971	+/-0.030	4.971			NEEN	CNC 03		
<u> </u>	124.100	+/-0.020	124.100			tope	16-22		

												DQA:	Date	:
NCR:	Yes	/ No				WORK ORDER NON-	COI	NFORM	AANCE / UP	DATE				
												QA Closed:	Date	•
Work Ord	er.					DISPOSITION				AGAINST	DE	PARTMENT	PROCESS	
Part I	No.					Rework Scrap Use-as-is Work Order Update	Scrap Machining Small Fab Use-as-is Thermoforming Finishing			i e	Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other		
Root					Descri	otion of work order update	Т	Initial	Act	tion		Sign &	· i	
Cause		Date	Step	Qty	c	or Non-conformance	Ct	nief Eng	Description			Date	Verification	QC Inspector
Doc/Data														
Equip/Tooling														
Operator														
Material			ļ											
Setup														
Other							1							
Process			ŀ											
Supplier														
Training				1										
Unapproved									• .					
						F	AUI	LT CATE	GORY					
Landi	ng (Gear				General		_				-		
}		Bending				Bend		Grain				Ovalized		Pressure/Forced
		Centre No	ot Conce	ntric to C	/s	BOM/Route	L	Hardwa	re .		L	Over/Under	tolerance	Temperature/Cure
		Cracks			L	Broken/Damaged	L	Inspecti	on Incomplete		L	Part Incorre	ct <u> </u>	Weld
		Crushed/	Crimped.			Burrs		Instruct	ions Incomplete/	Unclear		Part Lost/M	issing	Wrong Stock Pulled
		Cuffs				Contamination		Mainte	nance			Part Moved		
	Heat Treat					Countersink		Mislabe	led			Positioned V	Vrong	_
		Inspectio	n Strip in	Tube		Cut Too Short		Misread	1			Power Loss/	'Surge	Other
	Ripples in Bend					Drill Holes		Offset						

Out of Calibration

Outside Dimensions

Out of Sequence

Turning Sequence

Wave/Twist in Tube

Torque Waves in Extrusion

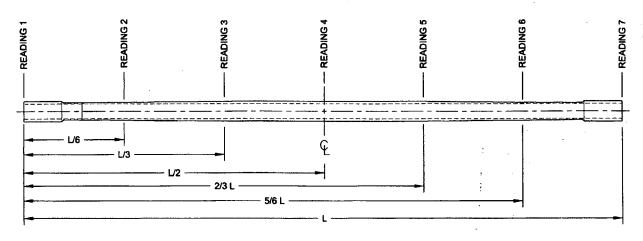
Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

DART AEROSPACE LTD	Work Order:	81157
Description: Crosstube Assembly (412 High Aft)	Part Number:	D412-664-243
Inspection Dwg: D412-664-243 Rev: E		Page 2 of 2

WALL THICKNESS MEASUREMENT



	WALL	THICKNESS I	MEASUREMEN	IT (IN)	Deviation			
Location	w1	w2 w3		w4.	Δw (max-min)	TOLERANCE		
READING 1 L= 0"	.394	.388	361	.362.	.033			
READING 2 L=	.310	.311	.324	.322	.014			
READING 3 L=	.494	.487	.477	.477	. 017	;		
READING 4 L=	,644	-637	.634	.638	.010	0.073"		
READING 5 L=	.377	.377	,380	. 376.	-084			
READING 6 L=	.314.	. 291	.325	.340	.026			
READING 7 L=	.483	,455	.490	.512.	.035			

Calibration Result

Actual Block Thickness: 100-500

Sitescan 250 Measured Thickness: 100-500

Measured by: VC
Date: 12-7-21

Audited by: Preliminary Approval:
Date: Date:

Rev	Date	Change	Revised by	Approved
A	04.06.16	New Issue (P/O D412-664-203)	KJ/JLM	
В	06.03.09	Dwg Rev updated	KJ/JLM	
С	07.05.08	Tolerance updated for dimension 4.971	KJ/JLM	
D	10.02.02	Dimension 124.100 was 124.09	KJ 10	11
E	12.06.04	Wall thickness form added	KJ 🐼	
				

												DQA.	Date.		
NCR:	Yes	/ No				WORK ORDER NON-	CON	IFORI	MANCE / UP	DATE		QA Closed:	Date:		
Work Orde	er.					DISPOSITION				AGAINST		PARTMENT/	PROCESS		
Part N	No. ₋					Rework Scrap Use-as-is Work Order Update		Skid-tube Crosstube Small Fab Thermoforming Finishing Composite				Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other		
Root					Descri	ption of work order update		nitial	Ac	tion		Sign &			
Cause	1	Date						ief Eng				Date	Verification	QC Inspector	
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training Unapproved															
						F	AUL	T CATE	GORY	,					
Landi					_	General						1		٦ .	
}	-	Bending			<u></u>	Bend	Grain					Ovalized		Pressure/Forced	
1		Centre No	ot Concer	ntric to (o/s	BOM/Route	Hardware			ŀ	Over/Under tolerance Temperature/Cure				

Inspection Incomplete

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread

Offset

Instructions Incomplete/Unclear

Broken/Damaged

Contamination

Countersink

Cut Too Short Drill Holes

Drawing

Finish

Folio

Burrs

DO 4.

Part Incorrect

Part Moved

Part Lost/Missing

Positioned Wrong

Power Loss/Surge

Weld

Other

Wrong Stock Pulled

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Cracks

Cuffs

Heat Treat

Crushed/Crimped.

Inspection Strip in Tube

Torque Waves in Extrusion

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

ltem	Qty -243	Part Number	Description
1	Х	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D2856-600-1009	ABRASION STRIP
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTROWBELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

1) MATERIAL: MANUFACTURED FROM D6009-129

FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2 PAINT OUTSIDE PER DART QSI 005 4.2

TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.

UNITS: INCHES UNLESS OTHERWISE NOTED.

BREAK SHARP EDGES: 0.005 TO 0.010 MAX.

- IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: 47.0 lbs (PER IIN-D212-664)
- PART IS SYMMETRIC ABOUT CENTERLINE.
- RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS2 1920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1, SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

81157

D

E	REORG TO CUR PAR 08- C8-3 & 6	ANIZED VIEW RENT STAND 046 (ZN A6-3)	GENERAL NOTES; S AND REFORMATTED DRAWING SARDS; RELOCATED FLAG #6 PER; ADD TOLERANCE (ZN 86-3, C4-3, TURNING DETAIL & UPDATED ET 4.	RF	09.09.30					
D	REMO	VE D2732-058	3, CHANGE TO D3595-063-570	PH	07.03.09					
С			0-1087, ADD D2732-058 & MS21920-32 WAS MS21920-30							
В	ADD H		OMPATABILITY WITH BHT/AA	PH	05.02.04					
A	NEW IS	SSUE		PH	01.10.17					
REV.			DESCRIPTION	BY	DATE					
DESIGN	Ī	PH	DART AEROSP	DART AEROSPACE LTD						
DRAWN		RF	HAWKESBURY, ONTAF							
CHECK	ED	97	DRAWING NO.		REV. E					
MFG. AF	PR.	12	D412-664-243	412-664-243 SHEET 1 OF 4						
APPRO	VED	10	TITLE	TITLE SCALE						
DE APP	R.	-#	CROSSTUBE ASSEMBLY (412 HI AFT) NTS							
	CORVEIGHT @ 2004 BY DART AFROSPACE LTD									

09.09.30

												DQA:	Dat	:e:	
NCR:	Yes	/ No				WORK ORDER NON-O	COI	VFOR	MANCE / UP	DATE					
								,				QA Closed:	Dat	ie:	
Work Orde	er.					DISPOSITION AGAINST DE)EP	EPARTMENT/PROCESS			
Part i	•					Rework Scrap		Skid-tube Crosstube Machining Small Fab			7	Water Jet Prod. Eng. Coor.			Engineering Quality
NCR No.						Use-as-is Work Order Update	Thermoforming Finishing Large Fab Composite				Rec/Stor	e/Packaging Supplier		Other	
Root					Descri	ption of work order update		Initial	Ad	ction		Sign &			
Cause						or Non-conformance	Cr	Chief Eng Description				Date	Verification	n]	QC Inspector
Doc/Data	Ш										- [
Equip/Tooling	Ш														
Operator	Ш								•						
Material			ľ											ļ	
Setup															
Other											ı				
Process											- [ļ	
Supplier	П													ļ	
Training			[!			
Unapproved	П						1				- [
						F	AUI	T CATE	GORY	······································					
Landi	ng G	Gear				General	•								
		Bending				Bend		Grain		Γ	٦	Ovalized		Г	Pressure/Forced
	П	Centre N	ot Conce	ntric to (o/s	BOM/Route Hardware				1	ヿ	Over/Under	tolerance		Temperature/Cure

Inspection Incomplete

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread

Offset

Instructions Incomplete/Unclear

Part Incorrect

Part Moved

Part Lost/Missing

Positioned Wrong

Power Loss/Surge

Weld

Other

Wrong Stock Pulled

Broken/Damaged

Contamination

Countersink

Cut Too Short

Drill Holes

Drawing

Finish

Folio

Burrs

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Cracks

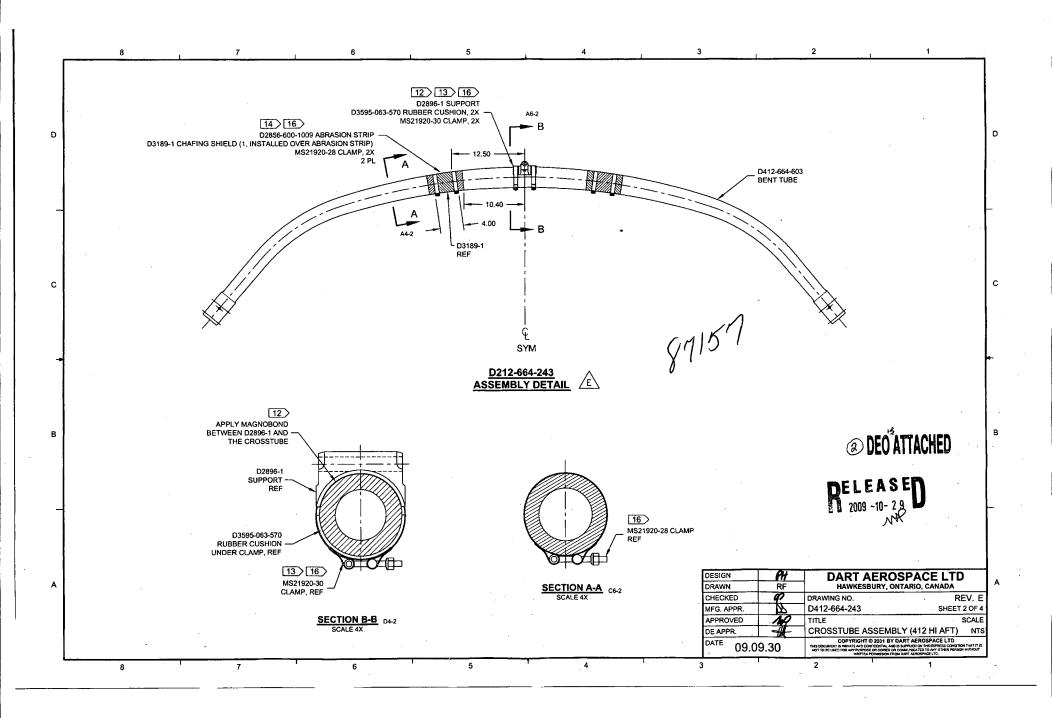
Cuffs

Heat Treat

Crushed/Crimped

Inspection Strip in Tube

Torque Waves in Extrusion



											DQA:	Date:	·	
NCR:	Yes	/ No				WORK ORDER NON-O	100	NFORM	ANCE / UPDATE					
											QA Closed:	Date:		
Work Ord	or.					DISPOSITION			AGAIN	NST DE	PARTMENT	PROCESS		
Part I						Rework Skid-tube Crosstu Scrap Machining Small F					Pro	Water Jet d. Eng. Coor.	Engineering Quality	
NCR No.						Use-as-is Thermoforming Finishing Work Order Update Large Fab Composite				Rec/Sto	Rec/Store/Packaging Supplier			
Root					Descri	ption of work order update		nitial	Action		Sign &			
Cause		Date	Step	Qty	(or Non-conformance	Ch	nief Eng	Description		Date	Verification	QC Inspector	
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Training			ľ											
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Landi	ng (Gear			_	General		-			-		3	
Bending Bend								Grain			Ovalized		Pressure/Forced	
	L	Centre No	ot Concer	ntric to	o/s	BOM/Route	L	Hardwa	re	L	Over/Under	tolerance	Temperature/Cure	
	L	Cracks				Broken/Damaged		Inspect	on Incomplete		Part Incorre	ct	Weld	
		Crushed/			Burrs		Instruct	ions Incomplete/Unclear		Part Lost/M	issing	Wrong Stock Pulled		
		Cuffs				Contamination		Mainte	nance		Part Moved		-	
j	Heat Treat Countersink							Mislabeled				Positioned Wrong		
	Inspection Strip in Tube Cut Too Short					Cut Too Short		Misread	I		Power Loss/	Surge	Other	

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

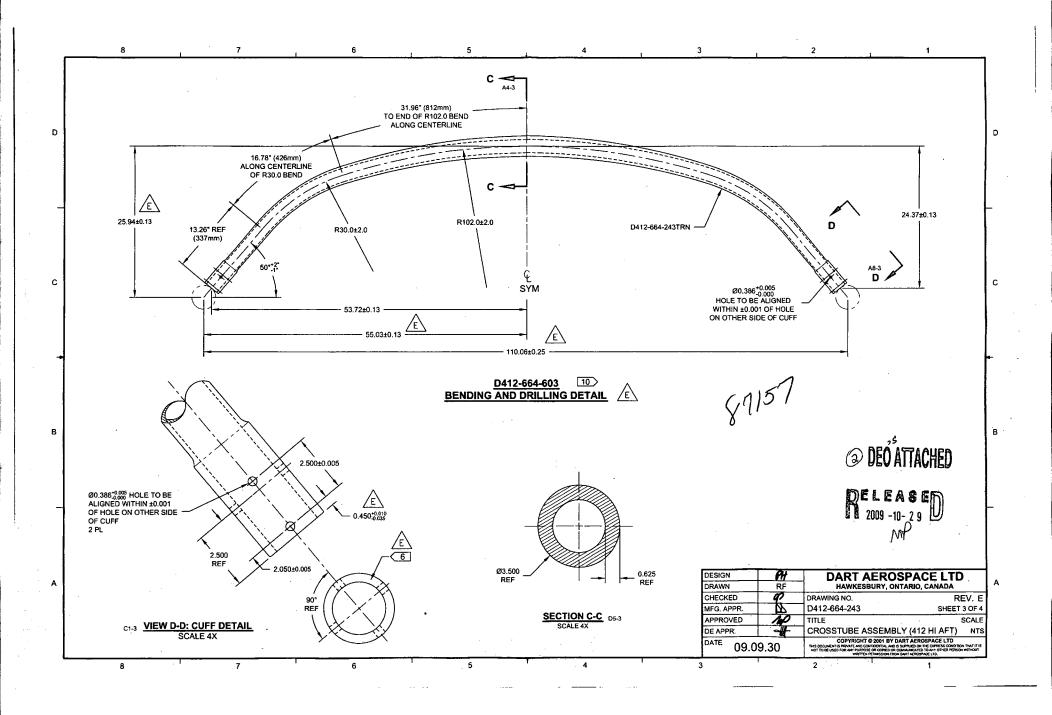
Torque Waves in Extrusion

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G



											DQA:	Date:	
NCR:	Yes	/ No				WORK ORDER NON-	100	VFORM	MANCE / UPE	DATE			
											QA Closed:	Date:	
Work Ord	er:					DISPOSITION				PROCESS			
Part No						Rework Skid-tube Crosstube Machining Small Fab Thermoforming Finishing Composite			Water Jet Prod. Eng. Coor. Rec/Store/Packaging Supplier		Engineering Quality Other		
Root					Descri	ption of work order update	П	Initial	Act	ion	Sign &		
Cause		Date	Step	Qty		or Non-conformance	Ch	nief Eng	Descr	iption	Date	Verification	QC Inspector
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	Crushed/Crimped. Burrs						Instruct	ions Incomplete/L	Jnclear	Part Lost/M	issing	Wrong Stock Pulled	
						Contamination					Part Moved	- <u>L</u>	. · ·
		Heat Trea	t		<u></u>	Countersink	\vdash				Positioned V	Vrong	
		Inspection	n Strip in	Tube		Cut Too Short		Misread			Power Loss/		Other

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

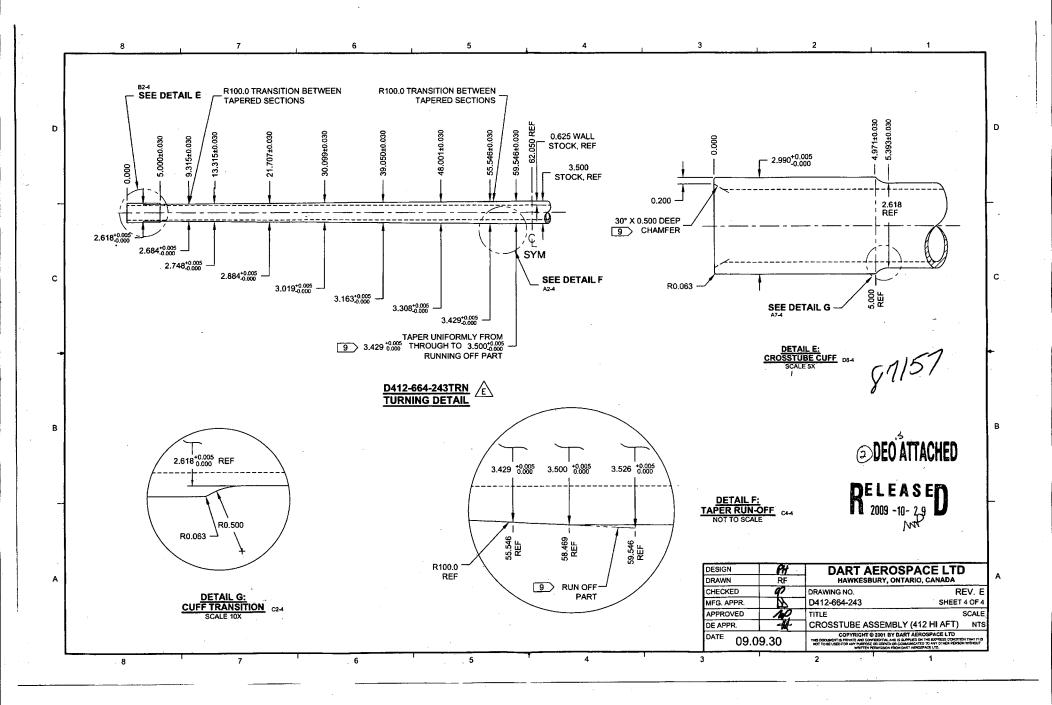
Torque Waves in Extrusion

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G



											DQA:	Date:	
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		•									QA Closed:	Date:	
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Part No.						Rework Scrap		Skid-tube Crosstube Machining Small Fab			Pro	Water Jet d. Eng. Coor.	Engineering Quality
NCR No.					 	Use-as-is Thermoforming Finishing Work Order Update Large Fab Composite			Rec/Stor	e/Packaging Supplier	Other		
Root					Descri	ption of work order update		nitial	Action		Sign &		
Cause		Date	Step	Qty	(or Non-conformance	Ch	ief Eng	Description		Date	Verification	QC Inspector
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		Centre No	ot Concer	ntric to	o/s	BOM/Route	L	Hardwa	re	L	Over/Under	tolerance	Temperature/Cure
	Cracks					Broken/Damaged		Inspecti	on Incomplete		Part Incorre	ct	Weld
	Crushed/Crimped, Burrs					Burrs		Instruct	ions Incomplete/Unclear		Part Lost/Mi	issing	Wrong Stock Pulled
		Cuffs				Contamination		Mainte	nance		Part Moved		_
		Heat Trea	it			Countersink	Г	Mislabe	led		Positioned V	Vrong	
		Inspection Strip in Tube Cut Too Short					Misread			Power Loss/	Surge	Other	

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Torque Waves in Extrusion

Drill Holes

Drawing

Finish

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DRAWING NO.	TITLE		REV. E	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D412-664-243	CROSSTUE	BE ASSEMBLY	Y (412 HI AFT)	ENGINEERING ORDER	D412-664-243-E-1	SHEET 1 OF 2	NTS
DRAWN	<u>k</u>	CHECKED (M	MFG. APPR.	APPROVED WAP	DE APPR.	
DATE 11	03.31	DATE)!	103.31	DATE 11.03.31	DATE 11/03·3)	DATE 11-03.31	

PURPOSE:

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

IS:

Item	Qty -243	Part Number	Description
6	0	D2856-600-1009	ABRASION STRIP

WAS:

6	2	D2856-600-1009	ABRASION STRIP

NOTES 2 AND 14, SHEET 1 ARE AMENDED AS FOLLOWS:

<u>IS:</u>

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA)

PAINT OUTSIDE PER DART QSI 005 4.2

AFTER PAINTING, APPLY CLEAR COAT ON HATCHED AREA

14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

WAS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.

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											DQA:	Date:	
NCR:	Yes	/ No				WORK ORDER NON-C	100	NFORM	ANCE / UPI	DATE	·		
											QA Closed:	Date:	
Work Ord	er:					DISPOSITION				AGAINST DE	PARTMENT	PROCESS	
Part No						Rework Skid-tube Crosstube Machining Small Fab Use-as-is Thermoforming Finishing Work Order Update Large Fab Composite			Small Fab Finishing	1	Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other	
Root					Descri	ption of work order update	١	nitial	Act	tion	Sign &		
Cause		Date	Step	Qty	(or Non-conformance	Ch	ief Eng	Descr	ription	Date	Verification	QC Inspector
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		Bending				Bend		Grain			Ovalized		Pressure/Forced
		Centre No	ot Concer	ntric to	o/s	BOM/Route		Hardwa	re		Over/Under	tolerance	Temperature/Cure
		Cracks				Broken/Damaged		Inspecti	on Incomplete		Part Incorre	ct	Weld
		Crushed/	Crimped.			Burrs		Instruct	ions Incomplete/l	Unclear	Part Lost/M	issing	Wrong Stock Pulled
	Cuffs					Contamination		Mainte	nance	,	Part Moved	<u></u>	
		Heat Trea	at			Countersink		Mislabe	led		Positioned \	Vrong	
		Inspection Strip in Tube Cut Too Short						Misread	1		Power Loss/		Other

Out of Calibration

Out of Sequence

Outside Dimensions

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Turning Sequence

Wave/Twist in Tube

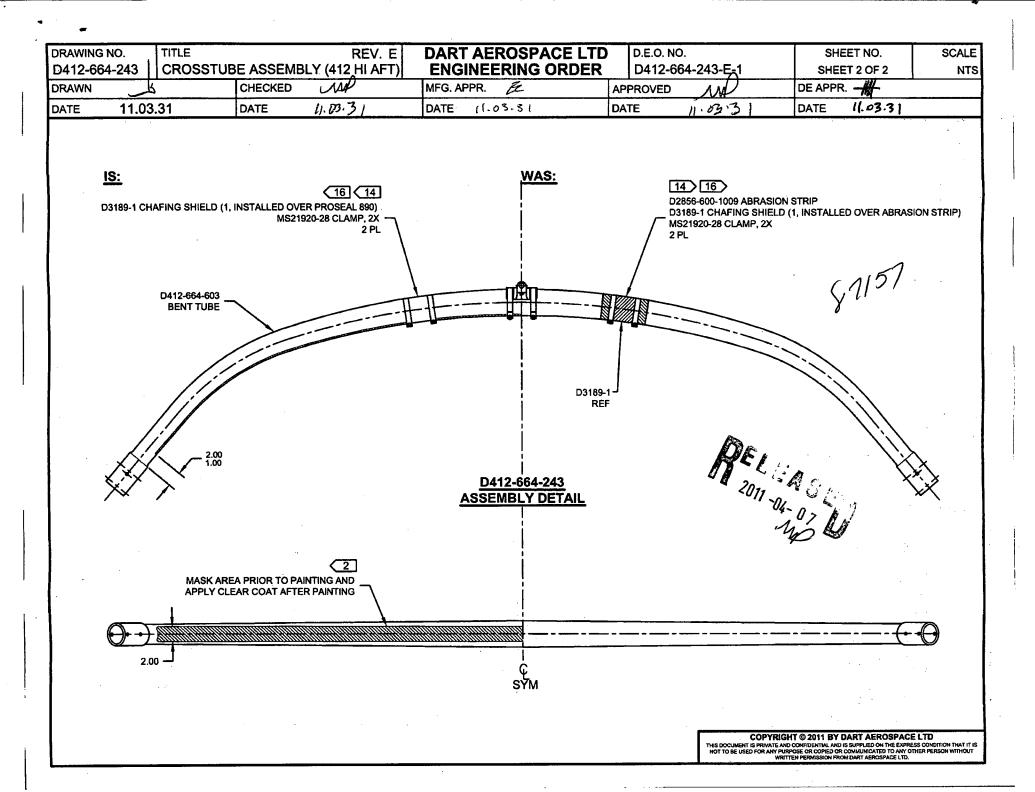
Ripples in Bend

Torque Waves in Extrusion

Drill Holes

Drawing

Finish



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				· · · · · · · · · · · · · · · · · · ·	DISPOSITION	T			ACAINST D	EPARTMENT,		
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Landii	ng Gear			_	General ¬ .				Г	–	1	
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	Cracks			-	Broken/Damaged	-		on Incomplete		Part Incorre	1	Weld
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	Heat Tre		. Tb	—	Countersink	-	Mislabe		-	Positioned \		Court
		on Strip in	iube	-	Cut Too Short Drill Holes	-	Misread	1	L	Power Loss/	Surge	Other
	Ripples	in Bend Waves in I	Eutricia	<u> </u> ⊢	⊰	\vdash	Offset	Calibration		·	······	
		waves in i Sequence		'' <u> </u> -	Drawing Finish	-					, , , , , , , , , , , , , , , , , , , 	
		wist in Tu		-	Folio	Out of Sequence					,	

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DRAWING N	NO. TITLE	REV. E	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D412-664	1-243 CROSSTUI	BE ASS'Y (412 HI AFT)	ENGINEERING ORDER	D412-664-243-E-2	SHEET 1 OF 1	NTS
DRAWN	P	CHECKED 15	MFG. APPR.	APPROVED M	DE APPR.	
DATE	11.09.07	DATE 11.09.19	DATE ((.09.19	DATE 11.09.19	DATE 11.09.19	

PURPOSE:

REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

CHANGE:

IS:

Item	Qty -243	Part Number	Description
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD

WAS:

	T	T	
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023
1			ADHESIVE (TEXTRON/BELL SPEC. 299-947-100,
1	1		TYPE II, CLASS 2 ADHESIVE)

NOTE 12 & 16, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.

WAS:

- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

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NCR:	⁄es	/ No				WORK ORDER	R NON-C	ONFOR	MANCE / UP	DATE	QA Closed:	Date:			
Mank Ond				-		DÍŠPOSIT	ION	1	AGAINST DEPARTMENT/PROCESS						
	Part No. NCR No.					R Us Work Order L	1	Skid-tube Machining noforming Large Fab	Crosstube Small Fab Finishing Composite	→	Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other			
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	Ш	Bending			L	Bend		Grain	2		Ovalized		Pressure/Forced		
1		Centre No	ot Conce	ntric to	o/s	BOM/Route		Hardwa	ire .	•• ••	Over/Under	tolerance	Temperature/Cure		
		Cracks			· L	Broken/Damaged			ion Incomplete		Part Incorre	ct	Weld		
	-	Crushed/	Crimped.		L	Burrs			tions Incomplete,	/Unclear	Part Lost/M	issing	Wrong Stock Pulled		
		Cuffs	•			Contamination	•	Mainte	enance	· _	Part Moved				
	Н	Heat Trea				Countersink		Mislabe	.		Positioned \		7		
	-	Inspection	•	Tube		Cut Too Short		Misrea		L	Power Loss/	Surge	Other		
	Ш	Ripples in	Bend			Drill Holes	• .	Offset							
	Ш	Torque W	/aves in E	xtrusio	n	Drawing -		Out of	Calibration 🚊	•					

Out of Sequence Outside Dimensions

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Turning Sequence

Wave/Twist in Tube

Drawing 🕆 Finish